Abstract Submitted
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Thermoelectronic emission from monolayer graphene with temperature dependent work functions DILIP DE[1], OLUKUNLE OLAWOLE, Covenant University — For the first time we have derived an equation for the temperature (T) dependent work function (W(T)) that will be important for modeling thermoelectronic current density (J) and energy distribution of emitted electrons specially, from nano-materials. The equation containing terms up to fifth power of T gives a modified Richardson-Dushman (MRDE) equation that fits excellently well the experimental data of J vs T for suspended graphene. It provides a unique technique for accurate determination of W_0, Fermi energy, E_{F0} at 0 K and surface density of charge carriers, n_s of graphene. The corresponding values obtained for suspended graphene are: $W_0 = 4.42 + 0.01$ eV, $E_{F0} = 0.166 + 0.002$ eV; $n_s = 2.34\text{x}10^{12}$ cm^{-2}. The model gives –ve thermal expansion coefficient of graphene (-$8\text{x}10^{-6}$ /K) which has been experimentally confirmed. The equations are expected to hold for carbon nanotubes.

[1]Please send us acceptance notice early so that we can apply for sponsorship from our University in time.

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